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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,663	08/31/2001	Shigeo Kittaka	N36-135850M/TH	7814
30743	7590	10/05/2004	EXAMINER	
WHITHAM, CURTIS & CHRISTOFFERSON, P.C. 11491 SUNSET HILLS ROAD SUITE 340 RESTON, VA 20190			STOCK JR, GORDON J	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/942,663

Applicant(s)

KITAKA ET AL.

Examiner

Gordon J Stock

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 and 17-27 is/are allowed.
- 6) ☒ Claim(s) 1-11 and 28 is/are rejected.
- 7) ☒ Claim(s) 12, 13, 15 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20040719</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings and Specification

1. The replacement drawing received on July 19, 2004 is accepted by the Examiner.
2. The drawings and specification are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: **4, 8, 9, 10, 11, and 12** of Fig. 20. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1, 4, and 6-11** are rejected under 35 U.S.C. 102(b) as being anticipated by **Burt et al. (6,052,213)**.

As for **claims 1, 4, 6-11**, Burt in an optical diffraction grating teaches the following: a periodic multiplayer structure comprising layers of InP and an end surface not parallel but approximately perpendicular to the layer surfaces is a beam incident surface and an exit surface also is perpendicular as a beam exit surface (Fig. 7a; col. 5, lines 65-67; col. 6, lines 1-15); wherein, the structure is a one-dimensioned photonic crystal (col. 6, lines 17-35); with the pillars being able to vary continuously in size at different depths or varying in cross section such as

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being ellipsoidal (col. 6, lines 13-17); wherein the end surface and exit surface crosses perpendicularly said layer surfaces and are parallel to each other (Fig. 1; Fig. 7a; Fig. 9a); wherein the structure formed and repeated due to dependence on wavelength (col. 6, lines 20-27); the multilayer structure is an optical multilayer film of epitaxial layers (col. 5, lines 1-45); the structure is formed upon a transparent substrate and the beams are reflected in the transparent substrate and taken out of said substrate (Fig. 1: 2; col. 4, lines 1-10); means for making a mixture of various luminous flux (Fig. 1: w; Fig. 9a: 93) and means for detecting rays of differing angles (Fig. 9a: 95 and output to terminal equipment).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 2-3** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Burt et al. (6,052,213)** in view of **Todori et al. (6,002,522)**.

As for **claims 2-3**, Burt discloses everything as above (see **claim 1**). He is silent concerning the particular period to wavelength relation of claim 2, and he does not state that one period is constituted by layers formed out of different materials. He does show a multilayer structure in Fig. 7a. However, Todori in an optical functional element comprising a photonic crystal teaches that the specific period to wavelength relation is necessary for proper signal transmission in optical communications; whereas, the period is equal to one half the wavelength and thereby is greater than or equal to one half the wavelength divided by any refractive index

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greater than or equal to 1.0 (col. 6, lines 35-50). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the photonic crystal device have a period greater than or equal to one half the wavelength divided by the refractive index in order to have proper signal transmission in optical communications. As for the one period constituted by layers formed out of different materials, Todor teaches that at least two different materials are periodically layered in order to create a photonic band structure and to properly direct light in optical multiplexing (col. 5, lines 25-65; col. 6, lines 1-45). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that the one dimensioned photonic crystal structure has a period constituted by layers formed out of different materials in order to properly direct light into multiplex channels in the device via a photonic band structure.

7. **Claims 5 and 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Burt et al. (6,052,213)** in view of **Joannopoulos et al. (6,130,780)**.

As for **claims 5 and 28**, Burt discloses everything as above (see **claim 1**). Burt is silent concerning the refractive index difference being not less than .1 in a wavelength used or having two differing refractive indices between respective layers. However, Joannopoulos in a photonic crystalline reflector device teaches that having a refractive index difference greater than .1 such as between 1.4 times to 3 times the refractive index of the other refractive material can increase transmittance (0 percent reflection in Fig. 6). Therefore, it would be obvious to have a difference in refractive indices be greater than .1 such as having one 1.4 to 3 times greater than the other material's refractive index to increase transmittance of the photonic device.

Allowable Subject Matter

8. **Claims 14 and 17-27** are allowed.

Claims 12, 13, 15, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to **claim 12**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical device the end surface used as the beam incident surface is approximately perpendicular to said layer surfaces and at least one surface parallel to said layer surfaces is provided as a beam exit surface in combination with the rest of the limitations of **claims 12-13**.

As to **claim 14**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical device the particular condition being satisfied, in combination with the rest of the limitations of **claims 14, 18-27**.

As to **claim 15**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical device the beam incidence surface is a surface parallel to said layer surfaces of said multilayer structure and wherein the beam exit surface is approximately perpendicular to said layer surfaces in combination with the rest of the limitations of **claims 15-16**.

As to **claim 17**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical device the particular condition being satisfied, in combination with the rest of the limitations of **claim 17**.

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Response to Arguments

9. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 872-9306

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

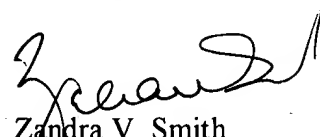
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs

September 29, 2004


Zandra V. Smith
Primary Examiner
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